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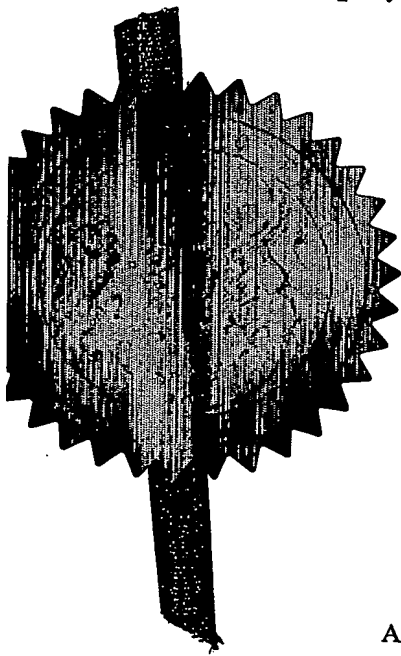
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*Stephen Hardy*

Dated 3 February 2004

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1/77

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Ciba Specialty Chemicals Water Treatments Limited  
Cleckheaton Road  
Low Moor  
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West Yorkshire  
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Patent ADP number (if you know it)

If the applicant is a corporate body, give  
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England

8610206001

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Patents Department  
PO Box 38  
Cleckheaton Road  
Low Moor  
Bradford  
West Yorkshire  
BD12 0JZ

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14 April 2003

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Jane Spinks

01274 417558

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Paper coating Compositions.

DUPLICATE

This invention relates to the use of binders in paper coating compositions and more particularly the use of binders to control bleed fastness of organic pigments applied to paper.

WO 98/39514 describes a paper coating method in which a coating composition includes a binder wherein the binder comprises a stable aqueous dispersion of a water insoluble component and a water soluble component. The water insoluble component comprises coalescable polymer particles which have a  $T_g$  less than 55°C and a majority of which have a particle size less than 1 micron; and the water soluble component comprises a water soluble polymer capable of inhibiting coalescence of said polymer particles, or a water soluble polymer and a component capable of inhibiting coalescence of said polymer particles; and wherein said water insoluble component comprises greater than 3% and less than 75% by weight of the binder solids and said water soluble component comprises greater than 25% and less than 97% of said binder solids. The purpose of this method is to provide improved crack at the fold properties for medium weight and heavy weight papers coated in a size press apparatus without adversely affecting other important properties or productivity of the papermaking process.

The aforesaid method, insofar as it is proposed for use with pigments is only concerned with inorganic pigments. It does not propose the use of inorganic pigments nor the problems of bleeding that arise with organic pigments that is to say colourants for surface colouration of paper. This problem is addressed by the present invention.

According to the invention there is provided a method of controlling the bleed fastness of organic pigments in paper coating compositions characterised in that the paper coating composition includes a binder of the kind defined above. In most cases the use of the aforesaid binder considerably improves the bleed fastness compared to coatings where the binder is omitted.

Preferably the amount of binder included in the pigment paste is in the range 1.0 to 20.0 % by weight, and more preferably 2.0 to 10.0 % by weight, based on the total weight of the paste. The precise amount of binder to be used may need to be adjusted for different pigments in order to obtain optimum bleed fastness.

The invention also provides for the use of binders as defined above in the method according to the invention.

The following Example further illustrates the invention.

Example

Size press baths were prepared, with each bath consisting of 100 grams total, of which 50 grams was a 10% solution of an oxidised farina starch.

After additions of starch, colour and binder ("Pensize" 730 commercially available from Penford Corporation of Bellevue, WA, USA), the total was made up to 100 grams with water.

Each bath was added, in turn, to a Werner Mathis size press, and a sample of white base paper passed through to produce a coloured sheet

The base paper, consisted of:

70% Bleached Hardwood Kraft  
30% Bleached Softwood Kraft

Loading 10% retained clay plus 1% retained chalk

Sizing 0.5% Pseudo neutral size (Hercat 27JP4)

This base paper was prepared on the pilot paper machine at The University of Manchester Institute of Science and Technology  
Each size pressing was checked for wet pick up (which varied from product to product, but generally speaking was found to be in the region of 40%, giving approximately 2% Pensize 730 on weight of paper) and dried in an infra red dryer for the minimum time required to give complete drying.

Ref	Irgalite	Grams Pensize 730	Grams color	Bleed Fastness
1	Yellow G-L	0	8.2	4
2		5	9.0	5
3	Yellow G-F	0	4.6	3-4/4
4		5	5.0	5
5	Yellow 2R-L	0	3.2	3-4
6		5	3.5	5
7	Red G-L	0	7.2	3-4
8		5	10.6	4-5
9	Red BF-L	0	16.0	3/3-4
10		5	17.0	5
11	Red 3B	0	20	2
12		5	22	2-3
13	Violet B-L	0	6.6	3
14		5	7.0	4-5
15	Violet M	0	6.2	2-3
16		5	6.8	3
17	Blue R-L	0	8.2	4
18		5	9.0	5
19	Green 2G	0	8.0	3-4
20		5	8.8	4-5/5
21	Green G-L	0	7.2	5
22		5	8.0	5
23	Black 2B-LN	0	2.2	5
24		5	5.0	5

The bleed fastness indicated in the above table was assessed by placing samples of coloured paper between white blotters soaked in de-ionised water. These blotters were placed between glass plates and the whole wrapped in cling film. A 1 kilogram weight was placed on the top of the glass plates, and the whole left for 24 hours.

After 24 hours, the blotting paper was air-dried and when dry, assessed for bleed using the standard grey scale, ref ISO 105-A03 1993.

This scale is a range of grey coated shades increasing in intensity. Each sample is placed adjacent to a white coated sample, such that increases in contrast are obtained. The scale itself goes from 5, where no contrast is seen (in effect 2 white coated samples) down to 1 where a considerable contrast is observed. The bleed from the colored sample is compared to this scale, and the contrast in the grey/white which most closely concurs with the contrast in the white blotter/bleed is taken as the bleed fastness rating for a piece of paper. The grey scale is prepared with "half units" e.g. 1-2, 2-3, 3-4, 4-5, and some assessments contain further subdivisions to distinguish between samples, e.g. 3-4/4

Quite clearly, the inclusion of Pensize 730 into the dye bath formulation has had an improvement on all samples where bleed was seen where the binder was omitted.

**Claims.**

1. A method of controlling the bleed fastness of organic pigments in paper coating compositions characterised in that the paper coating composition comprises a binder wherein the binder comprises a stable aqueous dispersion of a water insoluble component and a water soluble component. The water insoluble component comprises coalescable polymer particles which have a  $T_g$  less than 55°C and a majority of which have a particle size less than 1 micron; and the water soluble component comprises a water soluble polymer capable of inhibiting coalescence of said polymer particles, or a water soluble polymer and a component capable of inhibiting coalescence of said polymer particles; and wherein said water insoluble component comprises greater than 3% and less than 75% by weight of the binder solids and said water soluble component comprises greater than 25% and less than 97% of said binder solids.
2. A method as claimed in claim 1, wherein the binder is present in an amount of from 1.0 to 20.0% by weight based on the weight of the composition.
3. Use of a binder to control bleed fastness of organic pigment in a paper coating composition characterised in that the binder comprises a stable aqueous dispersion of a water insoluble component and a water soluble component wherein the water insoluble component comprises coalescable polymer particles which have a  $T_g$  less than 55°C and a majority of which have a particle size less than 1 micron; and the water soluble component comprises a water soluble polymer capable of inhibiting coalescence of said polymer particles, or a water soluble polymer and a component capable of inhibiting coalescence of said polymer particles; and wherein said water insoluble component comprises greater than 3% and less than 75% by weight of the binder solids and said water soluble component comprises greater than 25% and less than 97% of said binder solids.
4. Use as claimed in claim 3, wherein the binder is present in an amount of from 1.0 to 20.0% by weight based on the weight of the composition.
5. Paper coloured by the method as claimed in claim 1 or claim 2.

**Abstract****Paper coating compositions.**

The control of paper of bleed fastness of organic pigments in paper coating compositions wherein a binder is included in the composition, said binder comprising a stable aqueous dispersion of a water insoluble component and a water soluble component wherein the water insoluble component comprises coalescable polymer particles which have a  $T_g$  less than 55°C and a majority of which have a particle size less than 1 micron; and the water soluble component comprises a water soluble polymer capable of inhibiting coalescence of said polymer particles, or a water soluble polymer and a component capable of inhibiting coalescence of said polymer particles; and wherein said water insoluble component comprises greater than 3% and less than 75% by weight of the binder solids and said water soluble component comprises greater than 25% and less than 97% of said binder solids.



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**PCT/EP2004/050443**



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